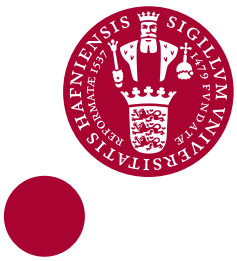

Diagnosis of canine thrombosis - a new approach?

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Diagnosis of canine thrombosis - a new approach?

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Ante mortem diagnosis of thrombosis in dogs remains a great challenge for clinicians, due to unspecific clinical signs and a lack of standardized approaches and validated diagnostic tests, which often results in a tentative diagnosis only. Thrombosis in dogs has been diagnosed by a vast number of methods, ranging from clinical signs, over findings on imaging examinations, blood samples or blood gas analyses to post mortem autopsies. Even though autopsy seems to be the ultimate way of confirming a suspected thrombotic event, this may result in a false-negative finding as post mortem thrombolysis can occur very fast in dogs.(1,2) Consequently, thrombosis in dogs may very well be under-diagnosed, which can potentially be fatal. Treatment on basis on a tentative diagnosis on the other hand, increases the extent of unnecessary antithrombotic treatment and the side effects thereof. Thus, a standardized and validated approach to diagnosis of thrombosis is warranted to improve diagnostic precision and implement correct therapeutic intervention.

Arterial and venous thrombosis is a common cardiovascular complication in humans. The majority of arterial thrombotic events are due to atherosclerosis and secondary embolism, whereas venous thrombosis occurs primarily as Deep Vein Thrombosis (DVT) in the veins of the distal limbs or Pulmonary (Thrombo) Embolism (PE or PTE). Especially the diagnosis of venous thrombosis is a subject of on-going investigation and recommendations for standardized approaches have been published. The results of a large multicentre study - the Prospective Investigation of Pulmonary Embolism Diagnosis (PIOPED) II trail - has led to a number of recommendations for diagnostic workup in humans.(3) These include clinical probability assessment of the patient based on standardized scoring systems, in combination with a D-dimer test. A low D-dimer result indicates

that no fibrinolysis of the cross-linked fibrin monomers found in thrombotic material has taken place and is as such interpreted as no thrombotic event.(4) The combined result of the clinical pre-test probability and the D-dimer provides acceptable sensitivity and specificity to distinguish between patients in which pulmonary embolism is unlikely and those who require further diagnostic imaging.(3) In patients with high pre-test probability or abnormal D-dimer result, Computed Tomography Pulmonary Angiography (CTPA) is the gold standard used to diagnose PTE. Due to the intimate relationship between DVT and PTE (where the pulmonary thrombi most often is embolized material from a DVT), an ultrasonographic evaluation (Compression Ultrasonography, CUS) of the lower limb veins can be performed simultaneously - however, this approach has not proven to possess any advantages in comparison with CTPA alone.(5)

Thrombosis in dogs is not as easily categorized as in humans with regard to pathogenesis, however thrombotic events in relation to atherosclerosis have not been described and thrombosis in veins of the limbs does not seem to be as common as human DVT. On the other hand, thrombosis in other parts of the vasculature in dogs such as the portal- or splenic veins, aorta, iliac- or femoral arteries has been documented.(6–8) Therefore, a diagnostic approach that is comparable to the standardized counterparts in humans could be a way to achieve better standardization for diagnosis of thrombosis in dogs. A diagnostic algorithm for assessment of clinical probability of PTE in dogs has been proposed, however this approach is only aimed at determining the clinical probability and is not an integrated strategy for diagnostic work-up of patients with suspected thrombosis.(9) Interestingly, the preliminary results of a prospective study using CTPA to identify PTE in critically ill dogs with clinical suspicion of a thrombotic event indicate that PTE occurs more frequently in these patients than previously described. The use of CTPA therefore seems promising and may very well be a part of future diagnostic algorithms together with ultrasonography, clinical pre-test probability and results of specific haemostatic analyses such as D-dimer.

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